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**REPORT ABOUT THE SCOPING MEETING FOR A SYNTHESIS REPORT  
FOR THE IPCC FOURTH ASSESSMENT REPORT  
Geneva, 6-8 July 2004**

(Submitted by the Secretary)

## **Report about the Scoping Meeting for a Synthesis Report for the IPCC Fourth Assessment Report Geneva, 6-8 July 2004**

### **1. Plenary Session I**

#### **1.1 Opening statement & presentation of background document**

The meeting was opened by the IPCC Chair Dr R. K. Pachauri on 6 July 2004 at 10.00 a.m. The IPCC Chair presented the background document and highlighted the following points:

- The draft scoping paper for a Synthesis Report (SYR) of the IPCC Fourth Assessment Report (AR4) has been prepared as a result of discussions that took place at the two scoping meetings for the AR4 held in Marrakech and Potsdam respectively. In addition, the SYR was also discussed at the 21<sup>st</sup> Session of the IPCC in Vienna during 3-7 November 2003, both in the Plenary itself as well as in a contact group established for the purpose.
- Subsequently, the proposal submitted to IPCC-XXI was modified and made available to governments for their comments. These comments have been taken into account in arriving at the current version.
- The purpose of the Scoping Meeting for a Synthesis Report is to help the IPCC Chair prepare a revised document that could be made available for further comments from governments, on the basis of which a proposal will be submitted to IPCC-XXII.

#### **1.2 Information needs and experience with the Third Assessment Report Synthesis Report (TAR SYR) and other IPCC publications**

The Chair invited representatives from the user community to give brief presentations about their information needs, how the TAR SYR and other IPCC publications met these information needs, and what their expectations from a possible AR4 SYR are. The main points are summarised below:

Mr. Harald Dovland (Norway, former SBSTA<sup>1</sup> Chair)

- The role of the IPCC is to provide and to disseminate assessments and it is important that the information is conveyed in a way that can be easily understood and avoids the risk of misinterpretation
- While government decision makers are a very important user group the receiving group is much broader than policymakers
- The SYR adds value to the Summaries for Policymakers (SPM) of the three working groups and should highlight and integrate main findings of the assessment
- The TAR SYR was used widely and therefore in preparing for an AR4 SYR one should just look for some improvement
- A structure around main heading might be better than around questions
- A communication expert should be involved in the writing process

Mr. Ko Ke Chow (Malaysia, former SBSTA<sup>1</sup> Chair)

- The TAR SYR is very useful, but it was too long and therefore the AR4 SYR should be in the order of 30-40 pages
- The AR4 SYR should not focus too much on the old questions, but address new emerging issues
- More information on adaptation and mitigation would be appreciated
- Involvement of a graphics designer and a communication expert is recommended

Mr. Bill Hare (Greenpeace)

- The TAR SYR was so far the most user-friendly IPCC publication, in particular the focus on key questions, integration and synthesis made it relevant for users

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<sup>1</sup> Subsidiary Body for Scientific and Technological Advice of the United Nations Framework Convention on Climate Change

- Problematic was the complexity of the TAR SYR questions
- An AR4 SYR should try to streamline the old questions without loss of generality, aim for better integration of Art. 2 issues and address new questions
- Layering of the product for different classes of users is important
- Popularization for media and general public should be done later to avoid oversimplification of SYR

Mr. Laurent Corbier (World Business Council for Sustainable Development)

- Novelty of TAR SYR was the richness and density of information on a new subject
- Target group of TAR SYR were specialists and science advisors in companies
- Tables and graphics were frequently used, but background data would enhance the usefulness
- Question answer format may not be the best format for future reports
- There is a need for an AR4 SYR, which conveys new knowledge but recaps also old messages
- The scope should include not only awareness, but also implementation of measures
- Long term scenarios should be better linked to near term steps and decisions

Mr. Saleemul Huq (Expert from Bangladesh)

- TAR SYR was written for climate change experts
- AR4 SYR should also try to also address other experts including from areas that may be hit by climate change such as water resources or agriculture
- Retain a regional aspect
- Give more thought to outreach

In the following plenary debate different views were expressed on whether to structure the AR4 SYR around questions or around topics. Concerning length, preference was expressed for a shorter report. Several participants highlighted the importance of addressing matters related to dissemination of information well in advance of releasing the AR4. It was further suggested to explain upfront how the IPCC process works, summarise key new findings and uncertainties, and to provide basic information such as limitations on what can be said about regions and how scenarios are developed. A user guide, which explains where additional information can be found in the underlying material was also suggested

### **1.3 Review of TAR SYR - structure, content and process followed**

The Secretary of the IPCC Ms Renate Christ gave a presentation about structure and content of the TAR SYR and described the process followed for preparing it. The slides presented are contained in Annex 4 to this report.

### **1.4 Establishment of breakout groups and drafting committee**

Four breakout groups were established. Three groups were asked to discuss assessment issues that need to be considered in a synthesis report, beginning with the questions addressed in the TAR SYR and to provide specific recommendations on issues/questions that may be considered in an AR4 SYR. A fourth breakout group was established to consider process issues.

Each breakout group on assessment issues was asked to consider a cluster of issues based on a set of questions from the TAR SYR (Annex 1) as follows:

Breakout Group 1 (Co-chairs David Griggs and Bubu Jallow) - questions 1 to 3

Breakout Group 2 (Co-chairs John Zillman and Lucka Kajfez-Bogataj) - questions 4 to 6

Breakout Group 3 (Co-chairs Richard Bradley and Ismail Elgizouli)- questions 7 to 9

The groups were requested to identify potential links to questions addressed in other clusters and analyse whether integration of elements from other clusters may improve the overall synthesis. In addition the groups were asked to consider the cross cutting themes identified for the AR4 as they relate to the cluster of questions, to review the list of issues submitted by the contact group at 21<sup>st</sup> Session of the IPCC for possible treatment in the AR4 SYR (Annex 2) and see which of those topics would add a new element to the integration and synthesis of knowledge in the SYR. In identifying themes attention had to be given to the Working Group report outlines accepted by IPCC-XXI.

During their first session the breakout groups were asked to consider in particular information needs and key questions of the user community; topics where key uncertainties were highlighted in the TAR; issues that have been adequately addressed in the TAR SYR and may not require revisiting in the AR4 SYR; and to identify specific sources of inputs and additional themes for cross working group interaction and communication. After an exchange of views in plenary the breakout groups received further guidance on the focus of their deliberations and how to prepare their report.

The breakout group on process (Co-chairs John Stone and Richard Odingo) was asked to address matters related to timing, form of publication and other process issues, taking into consideration relevant provisions of the IPCC procedures and to prepare a proposal for a process for preparing an AR4 SYR, with options as required.

An open ended drafting committee under the chairmanship of the IPCC Chair was established. Mr. Jim Penman was selected as rapporteur.

## **2. Plenary II**

During the second plenary reports from the first sessions of the breakout groups on assessment issues were considered and guidance was given to the groups on how to proceed further in developing concrete proposals. The breakout group on process issues presented a brief report.

### **2.1 Report from Breakout Group 1**

In the context of the cluster of questions assigned to it and the topics identified at IPCC-XXI the following points were considered in the first session:

#### **TAR SYR Question 1 (Article 2)**

It is still a valid for a new synthesis report as more information on key vulnerabilities and Article 2 science is available. However, the question cannot be answered in full without repeating other questions. Various options how to reflect the topic in the structure could be considered such as to put it upfront to set the context, to cover it in a road-map/user-guide, or as summary question at end.

#### **TAR SYR Question 2 (Past changes)**

It is still a valid question as more analyses are available to explain past changes. While the policy focus would remain on post-industrial era, paleo-climate also needs to be considered as it provides knowledge about climate processes. The question was raised where to consider analysis of past mitigation/adaptation actions.

#### **TAR SYR Question 3 (Future projections)**

This question overlaps with questions 4 and 6 and the debate focused on how to structure information on these topics while achieving integration and synthesis. Questions were raised, i.e. whether to consider two time scales – near term up to 30 years and far term beyond, whether to address regional and global consequences together or separately, and whether to treat extremes separately from mean change.

#### **List of issues from IPCC-XXI**

In its consideration of topics identified by IPCC-XXI (Annex 2) the group agreed that all topics could be addressed by a modified cluster I structure. It also noted that of important issues were not sufficiently covered in Annex 2.

The group discussed also issues of general nature such as

- The SYR needs a story line or logical structure, a road map/user guide and a place where mechanics and process are described
- Material from other assessments e.g. Millennium Ecosystem, Arctic Impact Assessment should be used and link to other environmental issues strengthened
- Uncertainties should be integrated throughout while robust findings and unresolved issues should be highlighted but not separated from their context
- Agreement needs to be reached on choice and availability of scenarios (including climate policy options and stabilization levels) time scales, how to treat regional issues and how to present uncertainties

The breakout group was asked to consider in its second session in particular how to present introductory items, the science related to Article 2, observation and attribution, and climate change projections.

## 2.2 Report from Breakout Group 2

The group considered in its first session the following topics:

- 1) Key new findings of AR4
  - Key issues and new findings upfront
  - What is new in the AR4 and what distinguishes AR4 from TAR
- 2) Climate extremes, hazards and their impacts
  - Floods, droughts, heavy rain, tropical cyclones etc.
  - Occurrence and impacts of these events in the past and in next 25, 50... years
  - Regional distribution of these events and their impact on regional development
  - Coping capacity, thresholds for adaptation
  - Future large scale abrupt nonlinear changes in atmospheric and biophysical systems
  - Large scale abrupt events of low probability
- 3) Key regional impacts and vulnerabilities
  - Key vulnerabilities and risk
  - Key impacts on ecosystems and sectors
  - Uncertainties, priorities for research
  - Regional modelling, scenarios, gaps in data
- 4) Key systemic impacts and vulnerabilities
  - Ecosystems, health and food
- 5) Integrating adaptation and mitigation
  - Need to integrate adaptation and mitigation strategies
  - Mitigation options, adaptation options and inter-linkages
  - Assessment of adaptive and mitigative capacity
- 6) Climate change in 2020, 2050, 2100 and the centuries beyond.
  - Climate change under a range of emission scenarios
  - Response time, inertia and lags in climate and socio-economic systems
  - Passing thresholds leading to irreversible or abrupt climate changes
- 7) Water, people and ecosystems
  - Impacts on the water cycle, water resources, demand and use
  - Impacts on floods and droughts
  - Regional winners and losers and coping strategies
- 8) Climate change and its influence on biodiversity and desertification.
  - Effect on water, ecosystems, forest, land degradation
  - Role of extreme weather events
  - Common requirements, synergies and needs for coordination
  - Formulation of strategies and action plans
- 9) The implication of various levels of stabilization of greenhouse gas concentrations or of various levels of climate change
  - Impacts and costs/benefits of climate change
  - Adaptation, costs/benefits
  - Mitigation, costs and benefits (including benefits of avoided climate change)
  - Sustainable development and equity issues
- 10) Mitigation options
  - Options available in the near and medium term
  - Costs
  - Co-benefits

In the plenary debate some concern was expressed that a too detailed topics structure may lead to over simplification and loss of integration. The breakout group was asked to consider in its second session in particular how to cover climate change projections, future systemic impacts, regional aspects, extreme events and large-scale nonlinear events.

### 2.3 Report from Breakout Group 3:

During the first session the following topics were discussed:

- 1) Coping with climate change
- 2) Adaptation – mitigation – inaction
- 3) Integrated options:
  - all gases and aerosols
  - sustainable development pathways, barriers, regional constraints
  - costs, benefits, co-benefits, avoided damage, win-win options
  - uncertainties and risks
  - timing ( 10, 30, 100 years)
  - technology development , transfer , diffusion, deployment
- 4) Policies, measures, mitigative and adaptive capacities, institutions

In the plenary debate it was suggested to address links between questions 6 and 7 and time frames, noting that there is not symmetry between adaptation and mitigation. The group was also asked to specifically consider in its second session links with other policy objectives, multiple stresses, technologies, sinks and matters related to sustainable development. The suggestion was made to highlight lessons learnt, near term options and measures with multiple benefits.

### 2.4 Guidance to Breakout Sessions II

As a general guidance groups were asked to no longer focus on the TAR SYR questions but to develop a new structure or logical framework. It was suggested that headings would be formulated as simple topics and as questions. It was also suggested to map back issues to the outlines of the working group reports and to the TAR SYR questions. The groups should also keep in mind the shift of information needs of policymakers from describing the problem to what can be done and potential new policy questions and requirements of the negotiations under the UNFCCC. The groups were further asked to make proposals how to best present reasons for concern, new findings and “important” findings contained in previous reports, and how to treat risk and uncertainties. Several specific suggestions were made such as how to present slow changes, extreme events and high risk events, to look at time frames, the interaction between adaptation and mitigation over time and in the regional context, links between climate change and other environmental and development issues and how to achieve low emission pathways.

## 3. Plenary III

### 3.1 Report of Breakout Group 1

In it's second session the group developed the following logical structure for an AR4 SYR:

- 1) Observed changes  
Has the climate changed and what are the associated effects?
  - Earth system (including paleo-climate)
  - Impacts
  - Costs
  - Adaptation experience
- 2) Causes of climate change  
What causes climate change?
  - Anthropogenic greenhouse gases, aerosols, natural variability
  - Feedbacks / sinks - physical, chemical, biological, social
  - Attribution – for climate and effects
  - Patterns of variability
- 3) Near term future (e.g. 2030)  
What climate change may occur in the near term and what would be its consequences?
  - Commitment to change (coordinate on extremes and regional with cluster 2)
  - Impacts
  - Adaptation, mitigation (including recent experience), technology options

- 4) Longer term future (to 2100 and beyond)  
 What climate change may occur in the longer term and what would be its consequences – key vulnerabilities and Article 2 science?
  - Timescales, inertia, lags in climate system
  - Irreversible change
  - Scenario projections – socio-economic change, climate projections
  - Impacts, (thresholds) key vulnerabilities, adaptation mitigation, costs, capacity, inertia and lags in human systems
  - Rapid non-linear changes
  - Stabilization (could also be treated as a separate major topic heading)
- 5) Longer term future (to 2100 and beyond with climate policy)  
 What climate change may occur in the longer term and what would be its consequences?
  - Timescales, inertia, lags
  - Scenario projections – socio-economic change, climate projections, impacts, adaptation mitigation, costs, capacity, inertia and lags
  - Rapid non-linear changes
  - Stabilization

In the plenary debate the question of how to approach the long term future was raised, considering the high uncertainties and time lags between near term emissions and long term effects. It was also suggested to distinguish between near term future with available technology, mid term with a mix of present a future technology and long term future.

### **3.2 Report from Breakout Group 2**

In the second session the discussion focused on three topics and a possible structure for an AR4 SYR.

- 1) Climate change hazards and risk  
 What are the implications of human induced climate change for the occurrence, frequency and intensity of floods, droughts, storms, heat waves and other extreme events; what will be their impact; and how might these be prevented or managed?
  - Floods, droughts, heavy rain, tropical cyclones, etc.
  - Weather and climate induced hazards such as stormsurges, landslides
  - Occurrence and impacts of these events in the past and in the next 20, 50 and 100 years
  - Coping capacity, thresholds, adaptation
  - Impacts on regional development
  - Regional distribution of these events and their impact
  - Risk and consequences of rapid and abrupt changes in the climate system
- 2) Climate change, water, ecosystems, human well-being and development  
 What will be the impacts of climate change on water availability and use, ecosystems, human well-being and development; and how might these impacts be prevented and managed?
  - Impacts on the water cycle
  - Impacts on floods and droughts
  - Impacts on water resources, demand and use
  - Regional winners and losers
  - Coping strategies
  - Effect on water, ecosystems, land use/land cover changes
  - Food security including agriculture and fisheries
  - Relationship to other environmental issues and their drivers including biodiversity and desertification
  - Multiple stresses
  - Human health
  - Common requirements and coordination needs
  - Formulation of strategies and action plans
  - Impacts on and implications for development pathways
- 3) Regional implications of climate change

How is human induced climate change expected to impact at the regional level; what will be the implications for ecosystems, people and socio-economic sectors of affected regions and countries; and how might individual countries prepare to cope with the implications of climate change?

- Key vulnerabilities and risk
- Key impact of climate change on human well-being, ecosystems and sectors (agriculture etc.)
- Uncertainties, priorities for research
- Regional modelling, scenarios, gaps in data
- Regional variations
- Winners and losers

Proposal for a possible structure of the AR4 SYR

- Simple heading or question (2 lines maximum)
- Short, straight, simple statement or answer (5 lines maximum)
- Longer explanation of the statement or answer above structured in the following manner:
  - a. what we do know for sure
  - b. what do we estimate (or what is modelled)
  - c. what is not known

In plenary the comment was made that risk and hazard are two different concepts, which need to be considered at two different time scales. It was also noted that the proposed topics may not provide sufficient integration and synthesis.

### **3.3 Report from Breakout Group 3**

During the second session the following list of questions evolved:

1. What is the evidence for human influence on climate change?
2. What is the human influence on climate change?
3. What is the projected future climate change and the rate of climate change?
4. How and when will climate change affect “me”?
  - How will the climate change (incl. uncertainties)?
  - What consequences will this have?
  - How will climate change affect my country’s (sustainable) development ambitions?
5. What level of long-term stabilisation of the climate to aim for?
  - What are the costs of stabilisation and the benefits of action in terms of avoided climate change?
  - What are the implications for short/medium term action?
6. What options do we have to do something about it?
  - What have we learned about what works and does not work?
  - What are the adaptation and mitigation options for the next 20 years in all sectors, all gases and sinks?
  - How can we make them work together?
  - What are the costs, spill-overs and benefits?
  - What synergies are there with other environmental issues?
  - Role of technology?
7. What could be done differently, how quickly would that have to be done and who should act?
  - How could we design (sustainable) development strategies that help to address climate change?
  - What can we say about the appropriate timing of action?
  - How can global cooperation to address climate change be achieved?

In the plenary debate specific suggestions were made such as to present a baseline outlook, to consider costs of inaction, to present available response options and costs for different time frames and to address the question how far technology can address the climate change problem.

### **3.4 Report from the Process Breakout Group**

The following issues were discussed in the breakout group and subsequently in the plenary session.

- Purpose:



The SYR should provide a comprehensive synthesis and integration of material contained in the IPCC Working Group assessment reports in an accessible style suitable for policymakers and their advisors and addressing a broad range of policy-relevant, but policy-neutral, issues.

- **Target audience:**  
The primary audience for the SYR is governments, including policymakers, their advisors and experts. However, it is recognized that the WMO and UNEP, being the IPCC's sponsors, will also have an interest as will other users in industry, environmental non-governmental organisations and the scientific community.
- **Scope:**  
The SYR will include material contained in the three Working Group reports. The SYR should be largely self-contained, but guide readers to the underlying material.
- **Time schedule:**  
Writing of the SYR should not begin until after the Working Groups have received and responded to comments from the expert review process - May, 2006. Approval of the SYR is scheduled for September, 2007.
- **Core Writing Team (CWT):**  
The CWT should be chaired by the Chairman of IPCC. It should also include the Vice-Chairs of IPCC, the Co-chairs of the three Working Groups, and in the order of 4-6 members of the author teams involved in each Working Group report. Members of the CWT should be chosen to ensure that the CWT has the scientific/technical expertise needed to carry out its task, to provide geographic balance, and a range of views. The members of the CWT will be nominated by the Chairman of IPCC, in consultation with the Co-Chairs, and approved by the Bureau.  
CWT members should be selected after the second LA meetings, when the scientific/technical issues to be addressed in AR4 are more clearly defined, and when the abilities of members of the author teams can be better assessed.  
During the discussion in the breakout group it was suggested that governments could be invited to recommend members for the CWT from among their countries' members of the Working Group author teams. Several participants objected to this and saw it as a departure from the IPCC practice. There was no agreement on this suggestion and it may be raised again at the forthcoming Plenary session of the IPCC.
- **Extended Writing Team (EWT):**  
Current IPCC procedures for developing the SYR do not provide for a EWT. Such a group was formed during the writing of the TAR/SYR to assist in its development. Should the decision be made to form a EWT for this SYR, it could include one member from each chapter of the Working Group author teams. The function of the EWT would be comparable to that of contributing authors.
- **Overall Structure:**  
The SYR should consist of three blocks of material:
  1. **Background material:**  
This would include a description of how the SYR was prepared and how it should be used, including a discussion of the limits to knowledge of the issues discussed (uncertainties and robust findings). Such information will help the reader use the SYR. Much of this material should appear before the SPM but parts of it could also appear through the text.  
Several points were made in the discussion of uncertainty:
    - Uncertainty should be discussed in the background material, as well as under each issue;
    - The degree of robustness of the findings, using consistent language, also needs to be highlighted.
  2. **SPM:**  
According to the current IPCC Procedures this would be 5-10 pages in length.
  3. **Body of the SYR:**  
According to the current IPCC Procedures this would be 30-50 pages in length.  
A number of government comments on the Chairman's document for the scoping meeting called for the SYR to be shorter and to avoid repetition. A proposal for achieving this goal by combining the SPM and the body of the report into a single document was discussed. Some participants of the breakout group saw difficulty in adopting this approach within existing IPCC procedures for developing the SYR. This issue will be taken up at the forthcoming IPCC Plenary session.  
The SYR should have an index.

- **Management of the SYR:**  
The development and review of the SYR should be managed by the Chairman of IPCC. Development of the SYR will require support of the type provided by the Technical Support Units (TSU) for each of the WGs. The Chairman suggested that he would look into providing such support from his country without taxing the limited IPCC funds. This would be an in-kind contribution from India. Another alternative included expanding the IPCC Secretariat. The Working Group co-Chairs stated that there was no flexibility within their current resources to provide this type of support. The group discussed the use of scientific communications specialists to help in the development of the SYR. A UNEP graphics expert had worked with the authors and provided valuable help in the development of the TAR/SYR. While there were some questions about this suggestion, it was recommended that the implications be explored and brought to the next meeting of the IPCC's Financial Task Team (FiTT).

### **3.5 Final Plenary Debate**

During the final plenary debate a number of issues were raised such as how to best present uncertainties, either upfront and/or under each topic, how to best present regional information and reasons for concern in terms of costs and other metrics. It was also recommended to reconsider the topics and questions developed during the scoping meeting in the light of information needs of policymakers. The need to present the SYR in a way that makes it easy to find the relevant information in the underlying assessment report was highlighted.

It was agreed that the drafting group will prepare a proposal for scope and content of the AR4 SYR for consideration by the Chair. Based on this proposal the Chair will prepare an output from the scoping meeting containing recommendations on the scope, content and process as requested by IPCC-XXI. This document will be circulated to governments for comments and based on the response received present a revised proposal to the 22<sup>nd</sup> session of the IPCC. A report from the scoping meeting would be presented as information document for IPCC-XXII. The list of participants is contained in Annex 3.

## Clusters of Questions from TAR SYR for Discussion in the Breakout Sessions

### Cluster I

- a. What can scientific, technical, and socio-economic analyses contribute to the determination of what constitutes dangerous anthropogenic interference with the climate system as referred to in Article 2 of the Framework Convention on Climate Change?
- b. What is the evidence for, causes of, and consequences of changes in the Earth's climate since the pre-industrial era?
  - Has the Earth's climate changed since the pre-industrial era at the regional and/or global scale? If so, what part, if any, of the observed changes can be attributed to human influence and what part, if any, can be attributed to natural phenomena? What is the basis for that attribution?
  - What is known about the environmental, social, and economic consequences of climate changes since the pre-industrial era with an emphasis on the last 50 years?
- c. What is known about the regional and global climatic, environmental, and socio-economic consequences in the next 25, 50, and 100 years associated with a range of greenhouse gas emissions arising from scenarios used in the TAR (projections which involve no climate policy intervention)?

To the extent possible evaluate the:

- Projected changes in atmospheric concentrations, climate, and sea level
- Impacts and economic costs and benefits of changes in climate and atmospheric composition on human health, diversity and productivity of ecological systems, and socio-economic sectors (particularly agriculture and water)
- The range of options for adaptation, including the costs, benefits, and challenges
- Development, sustainability, and equity issues associated with impacts and adaptation at a regional and global level.

### Cluster II

- a. What is known about the influence of the increasing atmospheric concentrations of greenhouse gases and aerosols, and the projected human-induced change in climate regionally and globally on:
  - The frequency and magnitude of climate fluctuations, including daily, seasonal, inter-annual, and decadal variability, such as the El Nino Southern Oscillation cycles and others?
  - The duration, location, frequency, and intensity of extreme events such as heat waves, droughts, floods, heavy precipitation, avalanches, storms, tornadoes, and tropical cyclones?
  - The risk of abrupt/non-linear changes in, among others, the sources and sinks of greenhouse gases, ocean circulation, and the extent of polar ice and permafrost? If so, can the risk be quantified?
  - The risk of abrupt or non-linear changes in ecological systems?
- b. What is known about the inertia and time scales associated with the changes in the climate system, ecological systems, and socio-economic sectors and their interactions?
- c. How does the extent and timing of the introduction of a range of emissions reduction actions determine and affect the rate, magnitude, and impacts of climate change, and affect the global and regional economy, taking into account the historical and current emissions?
- d. What is known from sensitivity studies about regional and global climatic, environmental, and socio-economic consequences of stabilizing the atmospheric concentrations of greenhouse gases (in carbon dioxide equivalents), at a range of levels from today's to double that level or more, taking into account to the extent possible the effects of aerosols? For each stabilization scenario, including different pathways to stabilization, evaluate the range of costs and benefits, relative to the range of scenarios considered in Cluster I, in terms of:

- e. Projected changes in atmospheric concentrations, climate, and sea level, including changes beyond 100 years
- f. Impacts and economic costs and benefits of changes in climate and atmospheric composition on human health, diversity and productivity of ecological systems, and socio-economic sectors (particularly agriculture and water)
  - The range of options for adaptation, including the costs, benefits, and challenges
  - The range of technologies, policies, and practices that could be used to achieve each of the stabilization levels, with an evaluation of the national and global costs and benefits, and an assessment of how these costs and benefits would compare, either qualitatively or quantitatively, to the avoided environmental harm that would be achieved by the emissions reductions
  - Development, sustainability, and equity issues associated with impacts, adaptation, and mitigation at a regional and global level.

### **Cluster III**

- a. What is known about the potential for, and costs and benefits of, and time frame for reducing greenhouse gas emissions?
  - What would be the economic and social costs and benefits and equity implications of options for policies and measures, and the mechanisms of the Kyoto Protocol, that might be considered to address climate change regionally and globally?
  - What portfolios of options of research and development, investments, and other policies might be considered that would be most effective to enhance the development and deployment of technologies that address climate change?
  - What kind of economic and other policy options might be considered to remove existing and potential barriers and to stimulate private- and public-sector technology transfer and deployment among countries, and what effect might these have on projected emissions?
  - How does the timing of the options contained in the above affect associated economic costs and benefits, and the atmospheric concentrations of greenhouse gases over the next century and beyond?
- b. What is known about the interactions between projected human-induced changes in climate and other environmental issues (e.g., urban air pollution, regional acid deposition, loss of biological diversity, stratospheric ozone depletion, and desertification and land degradation)? What is known about environmental, social, and economic costs and benefits and implications of these interactions for integrating climate change response strategies in an equitable manner into broad sustainable development strategies at the local, regional, and global scales?
- c. What are the most robust findings and key uncertainties regarding attribution of climate change and regarding model projections of:
  - Future emissions of greenhouse gases and aerosols?
  - Future concentrations of greenhouse gases and aerosols?
  - Future changes in regional and global climate?
  - Regional and global impacts of climate change?
  - Costs and benefits of mitigation and adaptation options?

**List of issues for possible treatment in the AR4 SYR, as submitted by the contact group on the subject at IPCC-XXI**

- 1) *Main findings of AR4.* What are the most robust and important findings of the AR4 Working Group reports? This would bring together, in very brief summary form, the 3 or 4 key conclusions from each of the three individual Working Group Reports. All subsequent questions would relate to issues that involve the synthesis of information from two or more Working Group reports.
- 2) *Regional information.* What are the most significant region-specific findings of the AR4?
- 3) *Natural and human-induced change.* How well is it possible to quantify the relative roles of anthropogenic emissions of greenhouse gases included in the UNFCCC as well as aerosols and other influences on past and future climate change and impacts?
- 4) *Lessons from palaeoclimates.* What can palaeoclimate studies tell us about climate change and impacts on *decadal* to century timescales?
- 5) *Constraints on near-term human-induced change.* What can be said about the nature and impacts of climate change over the next 15-20 years as a result of emissions that have already occurred?
- 6) *Climate change to 2050, 2100 and beyond.* What is the range of possible future climate change and its impacts to 2050, 2100 and beyond under a plausible range of emission scenarios and allowing for inertia and lags in the climate system?
- 7) *Climate change and water.* How important is climate change for the future quantity and quality of available freshwater?
- 8) *Climate extremes and their impacts.* How is future climate change expected to lead to changes in the frequency, severity and impacts of extreme weather and climate events?
- 9) *Climate change and sustainable development.* How can climate issues, influences and information be better integrated into national, regional, and global strategies for addressing other environmental issues and implementing the goals of sustainable development for all countries? And how can sustainable development strategies assist in addressing climate change?
- 10) *Mitigation options.* What are the mitigation options available for early implementation and what are their costs and other social, economic and environmental characteristics inclusive of co-benefits?
- 11) *Integration of adaptation and mitigation.* What are the main considerations which will help guide and balance of climate change mitigation and adaptation strategies, including mitigative and adaptive capacity?
- 12) *Technology and climate change.* What is the role of technology<sup>2</sup> in national, regional and global strategies for addressing climate change?
- 13) *Science in support of UNFCCC.* How do the findings of the AR4 change the scientific basis for addressing Article 2 of the UNFCCC including the determination of what constitutes “dangerous anthropogenic interference with the climate system”?
- 14) *Uncertain and unresolved issues.* What are the key gaps in information and understanding and the main areas of emerging scientific investigation?

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<sup>2</sup> The broadest of processes covering know-how, experience, and equipment used by humans to produce service as and transform resources.

**LIST OF PARTICIPANTS**

**IPCC AR4 Synthesis Report Scoping Meeting**

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## INVITED EXPERTS

(B) = IPCC Bureau Member

Ziad H. ABU-GHARARAH (B)  
Presidency of Meteorology & Environment (PME)  
P.O. Box 1358  
Jeddah 21431  
SAUDI ARABIA  
Tel: +966 2 6526435 (office)  
+966 2 6404027 (home)  
+966 55673848 (mob)  
Fax: +966 2 6530053 / 653 0542  
E-mail: mozziad@hotmail.com  
or ziad@pme.gov.sa

Anthony O. ADEGBULUGBE  
Centre for Energy Research & Development  
Obafemi Awolowo University  
Ile-Ife, Osun State  
NIGERIA  
Tel: +234 803 307 8287  
Fax: +234 1 497 7845/6680  
E-mail: heptagon\_ife@yahoo.co.uk  
or anthony\_adegbulugbe@yahoo.co.uk

Abdelkader ALLALI (B)  
Ministry of Agriculture, Rural Development  
& Forestry  
DPV B.P. 1387  
Rabat  
MOROCCO  
Tel: +212 656 01170  
Fax: +212 377 61557  
E-mail: allali@mailcity.com

Mohamed AL-SABBAN  
Ministry of Petroleum  
P.O. Box 20304  
Jeddah  
SAUDI ARABIA 21477  
Tel: +9662 6610 652  
Fax: +9662 6675 685  
E-mail: alsabbanms@usa.net

Majid AZADI  
Islamic Republic of Iran Meteorological Organization  
P.O. Box 13185-461  
Tehran  
IRAN, ISLAMIC REPUBLIC OF  
Tel: +98 21 6001 238  
Fax: +98 21 6001238  
E-mail: azadi68@hotmail.com

Lenny BERNSTEIN  
L. S. Bernstein & Associates, L.L.C.  
36 Sunset Summit  
Asheville, NC 28804  
USA  
Tel: +1 828 250 0245  
Fax: +1 828 250 0244  
E-mail: Lsberns@worldnet.att.net

Kansri BOONPRAGOB (B)  
Department of Biology - Faculty of Science  
Ramkhamhaeng University  
Thanon Ramkhamhaeng, Hau Mak  
Bangkapi  
Bangkok 10240  
THAILAND  
Tel: +66 2 310 8395  
Fax: +66 2 310 8395  
E-mail: kansri@ram1.ru.ac.th  
or bkansri@hotmail.com

Richard BRADLEY  
International Energy Agency- IEA  
Energy and Environment Division  
9, rue de la Fédération  
75739 Paris Cedex 15  
FRANCE  
Tel: +33 1 40 57 67 20  
Fax: +33 1 40 57 67 39  
E-mail: richard.bradley@iea.org

Eduardo CALVO BUENDIA (B)  
Jr. Nicanor Arteaga 549  
San Borja  
Lima 41  
PERU  
Tel: +511 346 2299  
Fax: +511 346 2299  
E-mail: ecalvo@terra.com.pe  
or e13calvo@hotmail.com

CHOW Kok Kee  
Malaysian Meteorological Service  
Jalan sultan 46667  
Petaling Jaya  
Selangor  
MALAYSIA  
Tel: +60 3 7956 9897  
Fax: +60 3 7955 0964  
E-mail: chow@kjc.gov.my

John CHURCH  
CSIRO Marine Research  
GPO Box 1538  
Hobart Tasmania 7001  
AUSTRALIA  
Tel: +61 3 6232 5207  
Fax: +61 3 6232 5123  
E-mail: john.church@csiro.au

Laurent CORBIER  
World Business Council for Sustainable Development  
4, chemin de Conches  
1231 Conches GE  
SWITZERLAND  
Tel: +41 22 839 3134  
Fax: +41 22 839 3131  
E-mail: corbier@wbcso.org

Wolfgang P. CRAMER  
Potsdam Institute for Climate Impact Research  
Telegrafenberg  
P.O. Box 601203  
D-144712 Potsdam  
GERMANY  
Tel: +49 331 288 2521/2637  
Fax: +49 331 288 2600  
E-mail: wolfgang.cramer@pik-potsdam.de

Chandrashekhara DASGUPTA  
C-12/11, DLF Qutab Enclave-Phase I  
Gurgaon 122 022  
INDIA  
Tel: +91 124 505 1009  
Fax: +91 11 2468 2144 / 2145  
E-mail: chandras36@hotmail.com or  
dasgupta@teri.res.in

Edmundo de ALBA ALCARAZ (B)  
Secretaría de Investigación y Desarrollo  
Universidad Nacional Autónoma de México  
Edificio de Coordin. de la Investig. Científica  
Circuito Exterior de Ciudad Universitaria  
04510 Mexico D.F.  
MEXICO  
Tel: +5255 5622 4276  
Fax: +5255 5606 1043 / 5668 0124  
E-mail: edeaa@servidor.unam.mx  
or edeaa@prodigy.net.mx

Harald DOVLAND  
Ministry of Environment  
P.O. Box Dep  
N-0030 Oslo  
NORWAY  
Tel: +47 22 245995  
Fax: +47 22 242755  
E-mail: harald.dovland@md.dep.no

Jean-Claude DUPLESSY  
Laboratoire des Sciences du Climat et de  
l'Environnement  
Parc du CNRS  
91198 Gif-sur-Yvette Cedex  
FRANCE  
Tel: +33 1 69 82 35 26  
Fax: +33 1 69 82 35 68  
E-mail: jean-claude.duplessy@lsce.cnrs-gif.fr

Jae EDMONDS  
Joint Global Change Research Institute  
University of Maryland  
Pacific Northwest National Laboratory  
8400 Baltimore Ave., Suite 201  
College Park, MD 20746-2496  
USA  
Tel: +1 301 314 6749  
Fax: +1 301 314 6760  
E-mail: jae@pnl.gov

Ismail A. ELGIZOULI (B)  
Higher Council for Environment &  
Natural Resources  
P.O. Box 10488  
Khartoum  
SUDAN  
Tel: +249 11 787616 / 122 52612 (mob)  
Fax: +249 11 787617 / 777017  
E-mail: elgizouli@yahoo.com  
or hcenr@sudanmail.net

B. Blair FITZHARRIS  
University of Otago  
Department of Geography  
P.O. Box 56  
Dunedin  
NEW ZEALAND  
Tel: +61 7 5449 4205  
Fax: +64 3 479 9037  
E-mail: bbf@hyperperth.otago.ac.nz

Ronald FLIPPHI  
Directorate Climate Change & Industry  
Ministry of Housing, Spatial Planning  
& the Environment  
P.O. Box 30945  
2500 GX Den Haag  
THE NETHERLANDS  
Tel: +31 70 339 4003  
Fax: +31 70 339 1313  
E-mail: ronald.flipphi@minvrom.nl

Ursula FUENTES-HUTFILTER  
Bundesministerium für Umwelt,  
Naturschutz und Reaktorsicherheit  
Division G II 1  
Alexanderplatz 6  
D-10178 Berlin  
GERMANY  
Tel: +49 1888 305 2312  
Fax: +49 1888 305 2312  
E-mail: ursula.fuentes@bmu.bund.de



David GRIGGS  
Meteorological Office  
Hadley Centre  
Fitzroy Road  
Exeter EX1 3PB  
UNITED KINGDOM  
Tel: +44 1392 886615  
Fax: +44 1392 885681  
E-mail: dave.griggs@metoffice.com

Sergey GULEV  
P.P. Shirshov Institute of Oceanography  
Nakhimovsky Avenue 36  
Moscow 117218  
RUSSIAN FEDERATION  
Tel: +7 095 124 7985  
Fax: +7 095 124 5983  
E-mail: gul@sail.msk.ru  
or gul@gulev.sio.rssi.ru

Philip M. GWAGE  
Department of Meteorology  
P.O. Box 7025  
Kampala  
UGANDA  
Tel: +25641 251798  
Fax: +25641 251797/256 166  
E-mail: pgwage@hotmail.com

William HARE  
Potsdam Institute for Climate  
Impact Research (PIK)  
P.O. Box 601203  
D-14412 Potsdam  
GERMANY  
Tel: +49 170 905 7015  
Fax: +49 30 44 6787 65  
E-mail: hare@pik-potsdam.de

Taka HIRAISHI (B)  
c/o Institute for Global Environmental Strategies  
2108-11 Kamiyamaguchi, Hayama  
Kanagawa 240-0115  
JAPAN  
Tel: +81 468 55 3750  
Fax: +81 468 55 3808  
E-mail: hiraishi@iges.or.jp

Saleemul HUQ  
International Institute for Environment  
And Development  
3, Endsleigh Street  
London WC1H 0DD,  
UNITED KINGDOM  
Tel: +44 20 7338 2117  
Fax: +44 20 7338 2826  
E-mail: saleemul.huq@iied.org

Bubu P. JALLOW (B)  
Meteorology Division  
Department of Water Resources  
7, Mumarr Al Ghaddafi Avenue  
Banjul  
GAMBIA  
Tel: +220 422 8216  
Fax: +220 422 5009  
E-mail: bubujallow@hotmail.com  
or dwr@gamtel.gm

Jean JOUZEL (B)  
Institut Pierre Simon Laplace  
Université Versailles Saint Quentin  
23, rue du Refuge  
78035 Versailles CEDEX  
FRANCE  
Tel: +33 1 39255816  
Fax: +33 1 39255822  
E-mail: jouzel@lsce.saclay.cea.fr

Lucka KAJFEZ-BOGATAJ (B)  
University of Ljubljana  
Biotechnical Faculty  
Jamnikarjeva 101  
SL-1000 Ljubljana  
SLOVENIA  
Tel: +386 1 4231161  
Fax: +386 1 4231088  
E-mail: lucka.kajfez.bogataj@bf.uni-lj.si

Andrej KRANJC  
Ministry of the Environment,  
Spatial Planning and Energy  
Dunajska c. 48  
1000 Ljubljana  
SLOVENIA  
Tel: +386 1 478 7434  
Fax: +386 1 478 7425  
E-mail: andrej.kranjc@gov.si

Thelma KRUG (B)  
Interamerican Institute for Global Change Studies  
National Institute for Space Research  
C.P. 515  
12227-010 Sao Jose dos Campos  
BRAZIL  
Tel: +55 12 3945 6895  
+55 12 9723 9076 (mob)  
Fax: +55 12 3941 4410  
E-mail: thelma@dir.iai.int

Zbigniew W. KUNDZEWICZ  
Polish Academy of Science  
Research Centre for Agricultural & Forest  
Environment  
Bukowska 19  
60 809 Poznan  
POLAND  
Tel: +48 618 475 601  
Fax: +48 618 473 668/175 336  
E-mail: zkundze@man.poznan.pl

Hans LARSEN  
Risoe National Laboratory  
P.O. Box 49  
DK-Roskilde  
DENMARK  
Tel: +45 4677 5101  
Fax: +45 4632 5199; +45 4632 1919  
E-mail: hans.larsen@risoe.dk

Peter LEMKE  
Alfred-Wegener Institute for Polar & Marine Research  
Columbusstrasse  
D-27515 Bremerhaven  
GERMANY  
Tel: +49 471 4831 1751  
Fax: +49 471 4831 1797  
E-mail: plemke@awi-bremerhaven.de

David M. LESOLLE  
Department of Meteorological Services  
P.O. Box 10100  
Gaborone  
BOTSWANA  
Tel: +267 3956 281/4  
Fax: +267 3956 282  
E-mail: lesolle.dm@info.bw  
or dlesolle@gov.bw

Jose A. MARENGO ORSINI  
CPTEC/INPE  
Rodovia Dutra Km 40  
12630 000 Cachoeira Paulista  
Sao Paulo  
BRAZIL  
Tel: +55 12 3186 8464  
Fax: +55 12 3101 2835  
E-mail: marengo@cptec.inpe.br  
or Ja\_marengo@yahoo.com

Concepción MARTINEZ-LOPE  
Oficina Española de Cambio Climatica  
Ministerio de Medio Ambiente  
Alcala No. 92  
E-28009 Madrid  
SPAIN  
Tel: +34 91 436 1490  
Fax: +34 91 431 7294  
E-mail: conchita.martinez@occc.mma.es

Gordon McBEAN  
ICLR- The University of Western Ontario  
1389 Western Road  
London, ONT N6A 5B9  
CANADA  
Tel: +1 519 661 4274  
Fax: +1 519 661 4273  
E-mail: gmbean@eng.uwo.ca

(B) Gylvan MEIRA FILHO  
Institute for Advanced Studies  
University of Sao Paulo  
Av. Macuco, 466 Apt. 91 - MOEMA  
CEP 04523-001  
Sao Paulo SP  
BRAZIL  
Tel: +55 11 5054 3143/3091 4442  
Fax: +55 11 5054 3143  
E-mail: lgylvan@uol.com.br

Bert METZ  
RIVM  
P.O. Box 1  
3720 BA Bilthoven  
THE NETHERLANDS  
Tel: +31 30 274 3990  
Fax: +31 30 274 4464  
E-mail: bert.metz@rivm.nl

Jennifer MORGAN  
WWF International, Berlin Office  
Grosse Präsidentstrasse 10  
D-10178 Berlin  
GERMANY  
Tel: +49 30 30 87 420  
Fax: +4930 30 87 4250  
E-mail: morgan@wwf.de

Margareth MUKAHANANA-SANGARWE  
Ministry of Environment and Tourism  
14th floor Karigamombe Centre  
53, Samora Machel Avenue  
Private Bag 7753, Causeway  
Harare  
ZIMBABWE  
Tel: +263 4 757874/757881/5  
Fax: +263 4 773276  
+263 4 75 7877  
E-mail: msangarwe@hotmail.com  
or met@ecoweb.co.zw

Teruyuki NAKAJIMA  
Center for Climate System Research  
University of Tokyo  
4-6-1 Komaba, Meguro-ku  
Tokyo 153-8904  
JAPAN  
Tel: +81 3 5453 3951  
Fax: +81 3 5453 3964  
E-mail: teruyuki@ccsr.u-tokyo.ac.jp

Elena NIKITINA  
Inst. of World Economy & Int. Relations  
Russian Academy of Sciences  
Profsovnaya Street 23  
Moscow GSP-7, 117997  
RUSSIAN FEDERATION  
Tel: +7095 946 8581  
Fax: +7095 1322 642  
E-mail: enikitina@mtu-net.ru

(B)

Shuzo NISHIOKA  
National Institute for Environmental Studies  
16-2 Onogawa  
Tsukuba 305 8506  
JAPAN  
Tel: +81 298 50 2301  
Fax: +81 298 51 2854  
E-mail: snishiok@nies.go.jp

Leonard NURSE  
Centre for Resources Management and Environmental  
Studies (CERMES)  
University of the West Indies  
Cave Hill Campus  
St. Michael  
BARBADOS  
Tel: +1 246 41 7 4548 / 4316  
Fax: +1 246 424 4204  
E-mail: lnurse@caribsurf.com;lnurse@ceesinc.com

Anthony NYONG  
Department of Geography and Planning  
Faculty of Environmental Sciences  
University of Jos  
P.M.B. 2084  
Jos, Plateau State  
NIGERIA  
Tel: +234 73 610936  
Fax: +234 73 456469  
E-mail: nyongao@hisen.org

Richard S. ODINGO (B)  
Department of Geography  
University of Nairobi  
P.O. Box 30197  
Nairobi  
KENYA  
Tel: +254 20 4627 651  
Fax: +254 20 336 885  
E-mail: odingo01@yahoo.com  
or r.odingo@meteo.go.ke

Laban OGALLO  
IGAD Climate Prediction and Application Centre  
(ICPAC)  
Faculty of Science, Chiromo Campus  
P.O. Box 10304  
GPO 00100 Nairobi  
KENYA  
Tel: +254 20 578 340  
Fax: +254 20 578 343  
E-mail: laban.ogallo@lion.meteo.go.ke  
or logallo@meteo.go.ke

Rajendra K. PACHAURI (B)  
Chairman IPCC  
TERI, Darbari Seth Block  
Habitat Place, Lodhi Road  
New Delhi 110 003  
INDIA  
Tel: +91 11 24682 121/2  
Fax: +91 11 24682 144/5  
E-mail: pachauri@teri.res.in

Jiahua PAN  
The Chinese Academy of Social Sciences  
Research Centre for Sustainable Development  
Room 1502, CASS Building  
5, Jiannei Dajie  
100732 Beijing  
CHINA, PEOPLE'S REP. OF  
Tel: +86 10 851 95788  
Fax: +86 10 8511 9035/6342 9925  
E-mail: panjh@163bj.com  
or panjiahua@hotmail.com

Govind B. PANT  
Indian Institute of Tropical Meteorology  
Dr Homi Bhabha Road, Pashan  
Pune 411 008  
INDIA  
Tel: +91 20 2589 3924  
Fax: +91 20 2589 3825  
E-mail: gbpant@tropmet.res.in

Martin PARRY (B)  
Hadley Centre, Met Office  
School of Environmental Sciences  
London Road  
Bracknell RG12 2SY  
UNITED KINGDOM  
Tel: +44 1986 781437  
Fax: +44 1986 781437  
E-mail: parryml@aol.com

Anand PATWARDHAN  
Indian Institute of Technology  
School of Management  
Powai, Mumbai  
Bombay 400076  
INDIA  
Tel: +91 22 2576 7788/7785  
Fax: +91 22 2572 3480/2872  
E-mail: anand@iitb.ac.in

Wm. Richard PELTIER  
Department of Physics  
University of Toronto  
Toronto, Ontario M5S 1A7  
CANADA  
Tel: +1 416 978 2938  
Fax: +1 416 978 8905  
E-mail: peltier@atmosph.physics.utoronto.ca

Jim PENMAN  
Global Atmosphere Division  
Department for Environment, Food and Rural Affairs  
Ashdown House, 3rd floor  
123 Victoria Street  
London SW1E 6DE  
UNITED KINGDOM  
Tel: +44 207 082 8152  
Fax: +44 207 082 8151  
E-mail: jim.penman@defra.gsi.gov.uk

Ramon PICHES MADRUGA (B)  
Centro de Investigaciones de Economía Mundial  
(CIEM)  
Calle 22 No. 309, entre 3ra y 5a Avenida  
Miramar, Habana 13, CP 11300  
CUBA  
Tel: +537 202 2958/209 2969  
Fax: +537 204 2507  
E-mail: rpichs@ciem.cu

Olga PILIFOSOVA  
UNFCCC Secretariat  
Haus Carstanjen  
Martin-Luther-King-Strasse 8  
D-53175 Bonn  
GERMANY  
Tel: +49 228 815 14 28  
Fax: +49 228 815 14 28  
E-mail: opilifosova@unfccc.int

Jan PRETEL  
Czech Hydrometeorological Institute  
Na Sabatce 17  
CZ-14306 Praha 4 - Komorany  
CZECH REPUBLIC  
Tel: +420 244 032 414  
Fax: +420 244 032 415  
E-mail: pretel@chmi.cz

Dahe QIN (B)  
China Meteorological Administration  
46, Zhongguancun Nandajie  
Beijing 100081  
CHINA, PEOPLE'S REP. OF  
Tel: +86 10 6840 6662  
Fax: +86 10 6217 4797  
E-mail: qdh@cma.gov.cn

Klaus RADUNSKY  
Spittelauer Lände 5  
A-1010 Vienna  
AUSTRIA  
Tel: +43 1 313 04 5534  
Fax: +43 1 313 04 5959  
E-mail: klaus.radunsky@unweltbundesamt.at

Bob REINSTEIN  
Reinstein & Associates International, Inc.  
Ryytikuja 3 L 104  
FIN-00840 Helsinki  
FINLAND  
Tel: +358 9 698 5420  
Fax: +358 9 621 1436  
E-mail: reinsteinb@aol.com

Jiawen REN  
Cold and Arid Regions  
Environmental & Engineering Research Institute  
Chinese Academy of Sciences  
Lanzhou  
Gansu 730000  
PR OF CHINA  
Tel: +86 931 827 2452  
Fax: +86 931 827 7094  
E-mail: jwren@ns.lzb.ac.cn  
or jwren@public.lz.gs.cn

John ROBINSON  
Sustainable Development Research Institute  
University of British Columbia  
1924 West Mall  
Vancouver, B.C. V6T 1Z2  
CANADA  
Tel: +1 604 822 9188  
Fax: +1 604 822 9191  
E-mail: johnr@sdri.ubc.ca

Jose ROMERO  
Office Fédéral de l'Environnement,  
des Forêts et du Paysage  
Division des Affaires internationales  
Papiermühlestrasse 172, Ittigen  
CH-3003 Bern  
SWITZERLAND  
Tel: +(0)31 322 6862  
Fax: +(0)31 323 0349  
E-mail: jose.romero@buwal.admin.ch

Agus SARI  
Pelangi - Energy and Transport  
Jalan Pangeran Antasari 10  
Kebayoran Baru  
Djakarta 12150  
INDONESIA  
Tel: +61 21 7280 1172  
Fax: +62 21 7280 1174  
E-mail: apsari@pelangi.or.id

Serguei SEMENOV  
Inst. of Global Climate & Ecology  
Glebovskaya Str. 20B  
107258 Moscow  
RUSSIAN FEDERATION  
Tel: +7095 307 1792  
Fax: +7095 160 0831  
E-mail: serguei.semenov@mtu-net.ru

Susan SOLOMON  
NOAA Aeronomy Laboratory  
Mailstop R/AL, Room 3A127  
325 Broadway  
Boulder, CO 80305-3328  
USA  
Tel: +1 303 497 3483  
Fax: +1 303 497 5686  
E-mail: solomon@al.noaa.gov

(B)

Aysar TAYEB  
Ministry of Petroleum  
P.O. Box 20304  
Jeddah  
SAUDI ARABIA 21477  
Tel: +9663 873 6102  
Fax: +9663 873 1209  
E-mail: aysar.tayeb@aramco.com

Richard SOMERVILLE  
Scripps Institution of Oceanography  
University of California, San Diego  
Mail code 0224  
9500 Gilman Drive  
La Jolla CA 92093-0224  
USA  
Tel: +1 858 534 4644  
Fax: +1 858 534 8561  
E-mail: rsomerville@ucsd.edu  
or richard.somerville@wanadoo.fr

Carine VANMAELE  
WMO  
C/CPA  
P.O. Box 2300  
1211 Geneva 2  
SWITZERLAND  
Tel: +41 22 730 8111  
Fax:  
E-mail: CVanMaele@wmo.int

Leena SRIVASTAVA  
TERI  
Darbari Seth Block, Habitat Place  
Lodhi road  
110-003 New Delhi  
INDIA  
Tel: +91 11 2468 2100 or 2111  
Fax: +91 11 2468 2144 or 2145  
E-mail: leena@teri.res.in

Jean-Pascal van YPERSELE (B)  
Institut d'Astronomie et de Géophysique  
G. Lemaître  
Université catholique de Louvain  
2, chemin du Cyclotron  
B-1348 Louvain-la-Neuve  
BELGIUM  
Tel: +32 10 473296 or 97  
Fax: +32 10 474722  
E-mail: vanyperselle@astr.ucl.ac.be

John M.R. STONE (B)  
Executive Director (Climate Change)  
Meteorological Service of Canada  
Environment Canada, 4th floor, North Tower,  
Les Terrasses de la Chaudière  
10 Wellington Street  
Hull, QUE K1A 0H3  
CANADA  
Tel: +1 819 997 3805  
Fax: +1 819 994 8854  
E-mail: john.stone@ec.gc.ca

Harlan WATSON  
Bureau of Oceans and International  
Environmental and Scientific Affairs  
US Department of State  
Washington DC 20520-7818  
USA  
Tel: +1 202 647 3484  
Fax: +1 202 647 3970  
E-mail: watsonhl@state.gov

Taishi SUGIYAMA  
Central Research Institute of Electric Power Industry  
1-6-1 Otemachi Chiyoda-ku  
Tokyo 100-8126  
JAPAN  
Tel: +81 3 3201 6601  
Fax: +81 3 3287 2864  
E-mail: sugiyama@criepi.denken.or.jp

David WRATT (B)  
NIWA  
P.O. Box 14-901  
Kilbirnie  
Wellington  
NEW ZEALAND  
Tel: +64 4 386 0588  
Fax: +64 4 386 0574  
E-mail: d.wratt@niwa.cri.nz

R.T.M. SUTAMIHARDJA (B)  
Ministry of Environment  
Jalan D.I. Panjaitan Kav. 24  
Kebon Nanas Jatinegara  
Jakarta 13410  
INDONESIA  
Tel: +62 251 324820  
Fax: +62 251 324820  
E-mail: suta-ipb@indo.net.id

Francis D. YAMBA  
University of Zambia  
Great North Road  
Box 32379 / Box E 721 Plot 1635  
Lusaka  
ZAMBIA  
Tel: +260 1240 267/1262482  
Fax: +260 1240 267  
E-mail: yamba@eng.unza.zm

Farhana YAMIN  
Institute of Development Studies  
University of Sussex  
Brighton BN1 9RE  
UNITED KINGDOM  
Tel: +44 1273 877369  
Fax: +44 1273 621202/691647  
E-mail: f.yamin@ids.ac.uk

John W. ZILLMAN  
Bureau of Meteorology  
GPO Box 1289K  
Melbourne, VIC 3001  
AUSTRALIA  
Tel: +613 9669 4250  
Fax: +613 9669 4169  
E-mail: j.zillman@bom.gov.au

#### **TECHNICAL SUPPORT UNITS**

Martin MANNING  
Technical Support Unit IPCC Working Group I  
NOAA Aeronomy Laboratory  
325 Broadway, R/AL8  
Boulder, CO 80305  
USA  
Tel: +1 303 497 4479 (direct)  
+1 303 497 3935  
Fax: +1 303 497 5686  
E-mail: mmanning@al.noaa.gov

Zhenlin CHEN  
IPCC WG I TSU (China)  
Department of International Cooperation  
China Meteorological Administration  
No. 46 Zhongguancun Nandajie  
Beijing 100081  
CHINA  
Tel: +86 10 6840 6146  
Fax: +86 10 6217 4797  
E-mail: cdccc@cma.gov.cn

Jean PALUTIKOF  
Technical Support Unit IPCC Working Group II  
Hadley Centre for Climate Prediction and Research  
Met Office, Fitzroy Road  
Exeter EX1 3PB  
UNITED KINGDOM  
Tel: +44 1392 886212  
Fax: +44 1344 856912  
E-mail: jean.palutikof@metoffice.com

Chris SEAR  
Technical Support Unit IPCC Working Group II  
Hadley Centre for Climate Prediction and Research  
Met Office, Fitzroy Road  
Exeter EX1 3PB  
UNITED KINGDOM  
Tel: +44 1392 886212  
Fax: +44 1344 856912  
E-mail: chris.sear@metoffice.com

Leo MEYER  
Technical Support Unit IPCC Working Group III  
P.O. Box 1  
3720 BA Bilthoven  
THE NETHERLANDS  
Tel: +31 30 274 4281  
Fax: +31 30 274 4464  
E-mail: leo.meyer@rivm.nl

Simon EGGLESTON  
Technical Support Unit TFI  
IGES  
2108-11 Kamiyamaguchi, Hayama  
Kanagawa 240-0115  
JAPAN  
Tel: +81 468 55 3750  
Fax: +81 468 55 3808  
E-mail: eggleston@iges.or.jp

#### **IPCC SECRETARIAT**

Renate CHRIST  
Secretary of the IPCC  
E-mail: RChrist@wmo.int

Alexandre ZAITSEV  
Consultant  
E-mail: AZaitsev@wmo.int

Chantal ETTORI  
E-mail: CEttori@wmo.int

Annie COURTIN  
E-mail: ACourtin@wmo.int



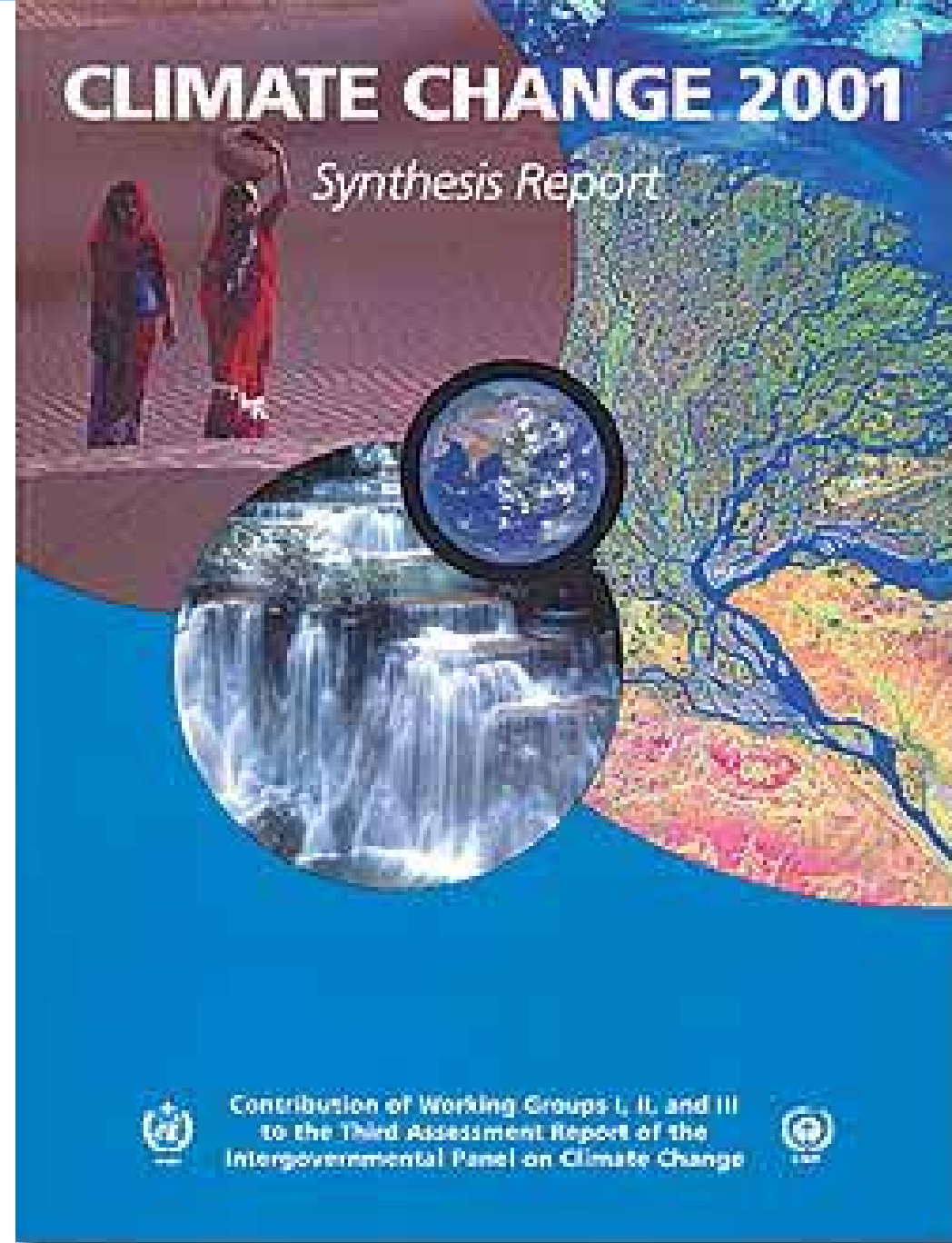
Process

Structure

Content

Renate Christ  
IPCC Secretary  
July 2004

IPCC





# History – SAR SYR

- Resolution of WMO Executive Council (July 1992 )
- address scientific technical information relevant to interpreting Article 2 of the UNFCCC

# History - TAR SYR

UNFCCC COP-3 (1997) requested SBSTA to “give further consideration to issues related to the work of the IPCC and to formulate policy relevant questions which should be addressed in the TAR”.

# TAR SYR - Preparatory Process

**September 1997- IPCC-13 Maldives**

- initial debate on SYR

**December 1997 - UNFCCC COP-3**

- decision 7/CP.3

**October 1998 - IPCC-14 Vienna**

- agreement on procedures for SYRs

**April 1999 - IPCC-15 Costa Rica**

- agreement on questions

# SYR – Procedures

- Definition of Synthesis Reports
- Longer report 30-50 pages and SPM 5-10 pages
- Adoption/approval process
  - section by section/line by line
- Questions approved by Panel
- Writing team
  - lead by IPCC chair
  - agreed by Bureau
- 5 Step process for preparation

# Synthesis Reports – Definition (1)

*“Synthesis Reports”* synthesise and integrate materials contained within the Assessment Reports and Special Reports and are written in a non-technical style suitable for policymakers and address a broad-range of policy-relevant but policy-neutral questions.

# Synthesis Reports – Definition (2)

They are composed of two sections as follows:

- (a) Summary for Policymakers and
- (b) a longer report

# SYR Process

Step 1: Writing team prepares draft

Step 2: simultaneous expert/government review (8 weeks)

Step 3: revision of draft

Step 4: submission to governments and organisations  
8 weeks before Panel Session

Step 5: Panel consideration of SYR

- provisional approval of SPM line by line
- Review and adoption of longer report section by section
- Revisions by authors as required
- Adoption and approval by Panel

# TAR SYR Writing team

- **Core writing team**

4-6 LAs and 1 Co-chair from each WG  
and Vice-chairs responsible for X-cut

- **Extended writing teams**

1 LA per chapter from each WG

- **Bureau members act as Review Editors**



# TAR SYR schedule

June	00	<b>Selection of WT</b>	
July	00	stocktaking	WG 1 CLA-4 + EWT
Aug	00	stocktaking	WG 2 and 3 CLA-4 + EWT
Sep	00		
Oct	00	<b>CWT-1</b>	
Nov	00		
Dec	00	<b>Informal Review</b>	
Jan	01		WG 1 Plenary + EWT
Feb	01		WG 2 Plenary + EWT
Mar	01	<b>CWT-2</b>	WG 3 Plenary + EWT
Apr	01	<b>Gov/Exp Review</b>	
May	01		
June	01	<b>CWT-3</b>	
July	01	<b>Final distribution</b>	
Aug	01		
Sept	01	<b>IPCC-18</b>	

# TAR SYR Process (2)

June 2000 - Writing team selected

July/Aug 2000 – stocktaking, CLA meetings

Oct 2000 - 1<sup>st</sup> meeting of core writing team

Jan-March 2001 – approval of WG reports

March 2001 – 2<sup>nd</sup> meeting of core writing team

April/May 2001 - Expert/government review

June 2001 – 3<sup>rd</sup> meeting of core writing team

Sept 2001 – IPCC –18 adoption/approval

# TAR SYR

## structure and publication

9 policy relevant questions

Question answer format

SPM - 33 pages, 11 figures

Longer report – 100 pages, 38 figures

# TAR SYR

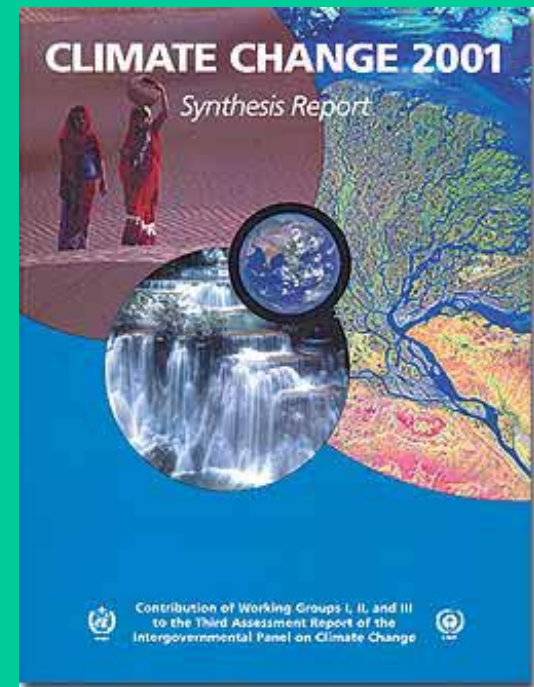
## structure and publication

### TAR Volume 4

- SYR
- SPM and TS of WG reports
- 400 pages, 6 languages

### SYR stand alone

- English only, 184 pages



# Question 1 (4 pp)

Emphasis on methodology

What can scientific, technical, and socio-economic **analyses contribute** to the determination of what constitutes **dangerous anthropogenic interference** with the climate system as referred to in **Article 2 of the Framework Convention on Climate Change?**

Ecosystems  
Food security  
Sustainable development

## Question 2 (14 pp)

What is the **evidence** for, **causes** of, and **consequences** of changes in the Earth's climate since the pre-industrial era?

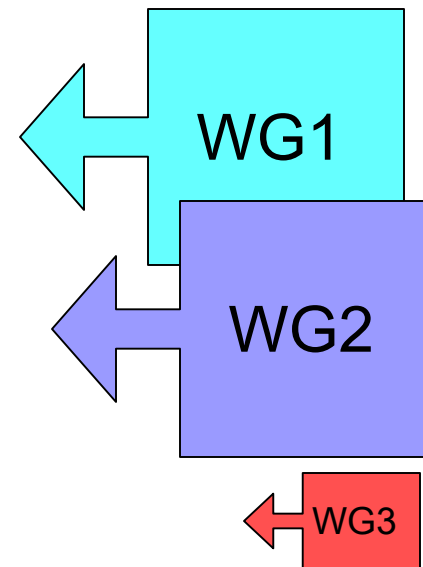
- a) **Has the Earth's climate changed** since the pre-industrial era at the regional and/or global scale? If so, what part, if any, of the observed changes can be **attributed to human influence** and what part, if any, can be attributed to natural phenomena? What is the basis for that attribution?
- b) What is known about the **environmental, social, and economic consequences of climate changes** since the preindustrial era with an emphasis on the last 50 years?

# Question 2 (14 pp)

Evidence for  
Causes of and  
Consequences of  
Climate change

*Observation*  
*Detection*  
*Attribution*

Since  
Pre-industrial era  
emphasis on  
last 50 years



# Question 3 (19 pp)

What is known about the regional and global climatic, environmental, and socio economic consequences in the next 25, 50, and 100 years associated with a range of greenhouse gas emissions arising from scenarios used in the TAR (projections which involve no climate policy intervention)?

To the extent possible evaluate the:

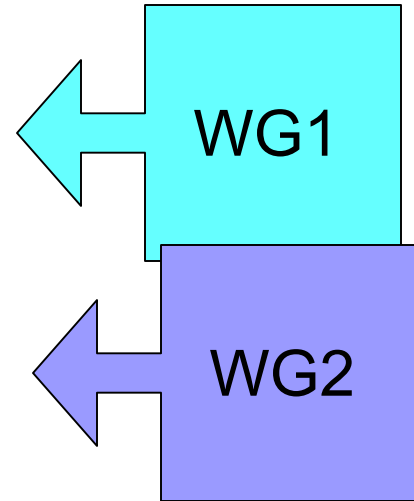
- Projected changes in atmospheric concentrations, climate, and sea level
- Impacts and economic costs and benefits of changes in climate and atmospheric composition on human health, diversity and productivity of ecological systems, and socioeconomic sectors (particularly agriculture and water)



## Question 3 (19 pp)

Consequences of increase in GHG emissions for

- GHG concentrations
  - Climate
  - Sea level
  - Human health
  - Ecosystems
  - Water and food
- 
- Adaptation options
  - Costs and SD issues



Emphasis - next 25, 50, 100 years  
SRES scenarios, no climate policy

Link with Q 6b and 4

# Question 4 (7 pp)

What is known about the influence of the increasing atmospheric concentrations of greenhouse gases and aerosols, and the projected human-induced change in climate regionally and globally on:

- a. The **frequency and magnitude of climate fluctuations**, including daily, seasonal, inter-annual, and decadal variability, such as the El Niño Southern Oscillation cycles and others?
- b. The duration, location, frequency, and intensity of **extreme events** such as heat waves, droughts, floods, heavy precipitation, avalanches, storms, tornadoes, and tropical cyclones?
- c. The **risk of abrupt/non-linear changes** in, among others, the sources and sinks of greenhouse gases, ocean circulation, and the extent of polar ice and permafrost? If so, can the risk be quantified?
- d. The risk of abrupt or non-linear changes in ecological systems?

# Question 4 (7 pp)

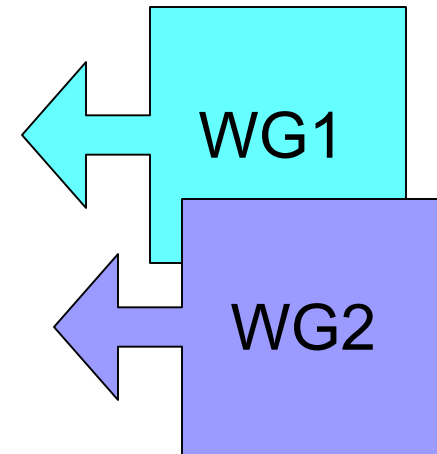
Frequency and magnitude  
of climate fluctuations

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Duration, location,  
frequency and intensity  
of extreme events

----

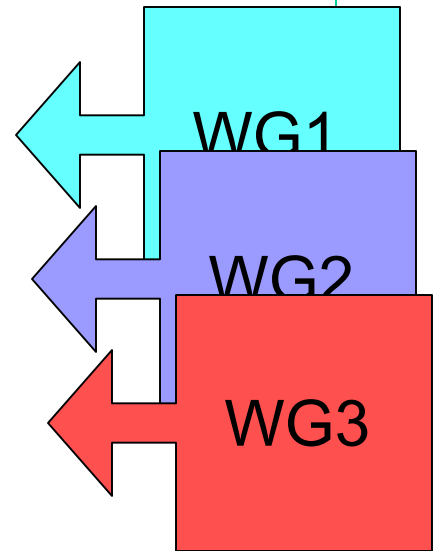
Risk of abrupt and  
non-linear changes



Link to Q 3 and 6b  
Add adaptation ?

## Question 5 (9 pp)

What is known about the **inertia** and **time scales** associated with the changes in the climate system, ecological systems, and socio-economic sectors and their interactions?



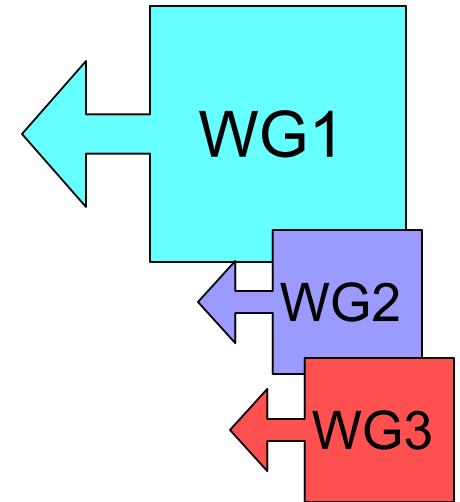
# Question 6 (8 pp)

- a) How does the extent and timing of the introduction of a range of emissions reduction actions determine and affect the rate, magnitude, and impacts of climate change, and affect the global and regional economy, taking into account the historical and current emissions?
- b) What is known from sensitivity studies about regional and global climatic, environmental, and socio-economic consequences of stabilizing the atmospheric concentrations of greenhouse gases (in carbon dioxide equivalents), at a range of levels from today's to double that level or more, taking into account to the extent possible the effects of aerosols? For each stabilization scenario, including different pathways to stabilization, evaluate the range of costs and benefits, relative to the range of scenarios considered in Question 3, in terms of:
- Projected changes in atmospheric concentrations, climate, and sea level, including changes beyond 100 years
  - Impacts and economic costs and benefits of changes in climate and atmospheric composition on human health, diversity and productivity of ecological systems, and socio-economic sectors (particularly agriculture and water)
  - The range of options for adaptation, including the costs, benefits, and challenges
  - The range of technologies, policies, and practices that could be used to achieve each of the stabilization levels, with an evaluation of the national and global costs and benefits, and an assessment of how these costs and benefits would compare, either qualitatively or quantitatively, to the avoided environmental harm that would be achieved by the emissions reductions
  - Development, sustainability, and equity issues associated with impacts, adaptation, and mitigation at a regional and global level.

# Question 6 (a)

Effects of emissions reductions on:

- Rate and magnitude of
  - Climate change
  - Impacts of climate change
- Economy

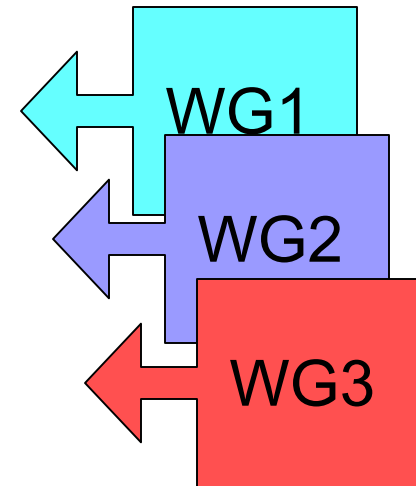


Links with Q 3, 4, 5 and 7

# Question 6 (b)

## Consequences of stabilising GHG concentrations on

- Climate
- Sea level
- Human health
- Ecosystems
- Water and food
- Adaptation options
- Mitigation options
- Costs, benefits, SD issues



Range of stabilisation levels  
Costs relative to SRES (Q3)  
Long term, 100 years and beyond

References to Q 3,  
and links with 4, 5 and 7

# Question 7 (15 pp)

What is known about the potential for, and costs and benefits of, and time frame for reducing greenhouse gas emissions?

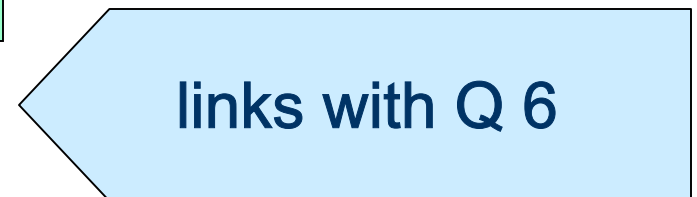
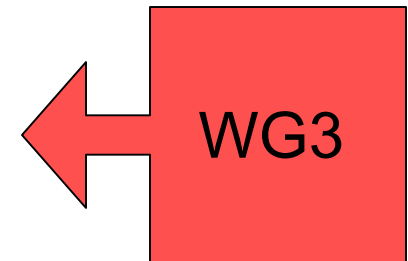
- What would be the economic and social **costs and benefits and equity** implications of options for policies and measures, and the mechanisms of the **Kyoto Protocol**, that might be considered to address climate change regionally and globally?
- What **portfolios of options** of research and development, investments, and other policies might be considered that would be most effective to enhance the **development and deployment of technologies** that address climate change?
- What kind of economic and other policy options might be considered to remove existing and potential **barriers** and to stimulate private- and public-sector technology transfer and deployment among countries, and **what effect might these have on projected emissions?**
- How does the **timing** of the options contained in the above affect associated economic costs and benefits, and the
- atmospheric **concentrations** of greenhouse gases over the next century and beyond?



# Question 7 (15 pp)

The potential for,  
costs and benefits of,  
and time frame for  
reducing greenhouse gas emissions

- Kyoto Protocol
- Effects on projected emissions
- Effect of timing on concentrations



## Question 8 (11 pp)

What is known about the interactions between projected human-induced changes in climate and other environmental issues (e.g., urban air pollution, regional acid deposition, loss of biological diversity, stratospheric ozone depletion, and desertification and land degradation)?

What is known about environmental, social, and economic costs and benefits and implications of these interactions for integrating climate change response strategies in an equitable manner into broad sustainable development strategies at the local, regional, and global scales?

# Question 8 (11 pp)

**Interactions between climate change  
and other environmental issues**

**Integration of climate change response strategies  
into sustainable development strategies**

# Question 9 (10 pp)

What are the most robust findings and key uncertainties regarding attribution of climate change and regarding model projections of:

- Future emissions of greenhouse gases and aerosols?
- Future concentrations of greenhouse gases and aerosols?
- Future changes in regional and global climate?
- Regional and global impacts of climate change?
- Costs and benefits of mitigation and adaptation options?

# Question 9 (10 pp)

**Robust findings and  
key uncertainties**

**Future emissions  
Concentrations  
Climate change  
Impacts  
Costs and benefits of  
mitigation and adaptation**

**All Questions**

# Concluding remarks (1)

## Questions very complex and detailed

- Overlaps and repetition hampered integration and synthesis
- Simpler questions, details in guidance to authors, but response will depend on new knowledge

## Projected impacts of climate change

- Addressed in 3 different questions
- Overlaps and numerous cross references
- Information not yet specific enough to address time frames and conditions stipulated in questions
- Leave flexibility to authors to decide, based on new knowledge, how to best structure information

# Concluding remarks (2)

## Adaptation

- Requested in several questions but only little information available

## Mitigation

- Only addressed in one question but asked for in other questions

- Q 3, 6, 7 and 8 would benefit from inclusions of various aspects of integrated analysis of adaptation and mitigation

# Concluding remarks (3)

## Sustainable development and equity

- Asked and addressed in several questions
- Answers rather general and repetitive

## Link with other environmental issues

- Information in WG contributions on some issues rather limited
- AR4 WG outlines address more Q8 issues
- Broaden “old” Q 8 to also address SD issues?



# Concluding remarks (4)

## Regional information

- Requested in several questions but only addressed in a few tables
- Agree in advance whether and how to present regional information in the SYR

## UNFCCC Art. 2

- Only framework with references to full volumes
- Provide synthesis of Art2/KV theme?